

Modelling the risk of Key Revegetation Species to a Changing Climate

Revegetation
Risk
Project D5

This project will increase understanding of the potential impacts of climate change on riparian vegetation communities and opportunities to effectively build resilience or transition vegetation communities along Melbourne's waterways.

Project Team:

University of Melbourne

Craig Nitschke

Yung En Chee

Linda Parker

Sacha Jellinek

Stefan Arndt

Melbourne Water

Rhys Coleman

Paul Rees

Matilda Manning

External

Elisa Raulings (Greening Australia)

Andrew Weeks (CESAR)

Adam Miller (Deakin University)

The conservation of biodiversity relies on healthy vegetation, but Victoria's native vegetation communities are increasingly suffering from the effects of multiple pressures, including climate change.

This has implications for revegetation and restoration practices that select plant species/ provenances that developed under the cooler and wetter conditions of the past. Species currently chosen for revegetation may not be able to tolerate future climate conditions leading to wide ranging failures in planted sites, resulting in increased revegetation costs and reduced ecosystem services provided by this vegetation.

While guidelines have been developed on how best to make restored and remnant vegetation communities more resilient to a changing climate, they have not identified which revegetation species may be negatively affected by climate change in the future.

Aims

This project will develop statistical and mechanistic species distribution models to predict the future distribution of key revegetation species under a changing climate in Victoria.

Methodology

The project will use multiple methods to achieve this aim, including:

- Development of statistical species distribution models (SDMs) to characterise species-environment relationships for 31 MW key revegetation species.
- The parameterisation of a mechanistic model for 6 species of interest, simulating the impact of climate variability and change on the germination and establishment potential for plant spe-

cies at a daily time step across multiple years (1 – 50 years) and soil types.

- Exploring provenance effects in mechanistic modelling.
- Use of climate matching approaches to identify areas within the current predicted distribution of the 31 species that match with the future predicted climate scenarios of interest identified for the Melbourne Water region.
- A workshop to bring together, share and discuss the results from the modelling, drought trial and genetics work.

Expected outcomes

- Understanding potential changes in the distribution (climate suitability) of key revegetation species used by MW under climate change.
- Quantitative info to understand species risk and guide species selection for revegetation under climate change.
- Information on potential seed sourcing for climate-adapted seed for the 31 species
- Use developed species models to inform selection and monitoring of climate change vulnerable plant species
- Understanding context and key considerations for developing climate smart revegetation practices that foster adaptation to a changing climate.

The anticipated **impact** of this project include changes to: i) species selection for climate resilient plantings; and ii) practices on how to supply/collect/grow seed for climate adjusted plantings.